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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,935	12/03/2003	Ralph T. Yang	UMJ-116-E (2172p3)	5384
29296	7590	09/23/2005	EXAMINER	
JULIA CHURCH DIERKER DIERKER & ASSOCIATES, P.C. 3331 W. BIG BEAVER RD. SUITE 109 TROY, MI 48084-2813			DANG, THUAN D	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/726,935

Applicant(s)

YANG ET AL.

Examiner

Thuan D. Dang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,6,8-21 and 23-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8-21 and 23-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/29/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-3, 5-6, 8-21, and 23-42 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not support the pretreatment step as called for in claims 2, 10 and 17 during which the dehydrated sorbent is produced.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 5-6, 8-21, and 23-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the term “dehydrated” is indefinite since it is unclear how it is dehydrated such as drying, centrifuge or heating ...

Claim Rejections - 35 USC § 103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 1, 2, 19, 21, 25, and 26 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285).

Michlmayr discloses a process of removal of thiophenes from gasoline by contacting the feed with an adsorbent which is silver exchanged faujasite zeolite, namely silver-Y zeolite (the abstract; examples).

Michlmayr does not disclose if the sorbent is dehydrated or not. However, It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by dehydrating the sorbent (if it is wet) since it is non-sense to use a wet sorbent for the process.

Michlmayr is silent as to the mechanism how thiophene is bound to the adsorbent, namely pi-complexation bonds (see entire patent for details). However, it is expected that the silver-Y zeolite adsorbent of Michlmayr is inherently bound to thiophene by pi-complexation since the adsorbent of the claimed process and the one of Michlmayr are similar.

Similarly, it is expected that the Michlmayr can inherently adsorb more than 1/mmol/gram of thiophene since the adsorbent of the claimed process and the one of Michlmayr are similar.

The temperature and pressure of the process can be found on column 1, lines 30-40.

Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285).

Michlmayr discloses a process as discussed above.

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Michlmayr does not disclose that the silver exchanged Y zeolite is Ag(I)Y. However, it is obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using Ag(I)Y since it is expected that using any silver exchanged Y zeolite would yield similar results.

Michlmayr also does not disclose that the gasoline is unleaded (see the entire patent for details). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using unleaded gasoline since it is expected any gasoline containing thiophene can be treated.

Claim 5 is rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Tsybulevskiy et al (US2002/0009404).

Michlmayr discloses a process as discussed above.

Michlmayr does not disclose a carrier for the adsorbent. However, Tsybulevskiy discloses an adsorbent also containing binder such as silica (paragraph 0041).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by including a binder to the adsorbent to arrive at the applicants' claimed process since it is expected that this would increase the strength of the adsorbent.

Once, a binder such as silica is obviously selected as the binder, metals are expected also to cover on the binder. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by selecting appropriate silica having appropriate surface area to optimize the properties of adsorbent.

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Claim 6 is rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Tsybulevskiy et al (US2002/0009404) further in view of Satokawa et al (US2001/0014304A1).

Michlmayr discloses a process as discussed above.

Michlmayr does not disclose that the silver is silver nitrate (see entire patent). However, Satokawa discloses an adsorbent used for adsorb thiophene containing silver nitrate (abstract; paragraph 54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using silver nitrate as the silver component since Satokawa discloses that his adsorbent exhibits excellent absorptivity of sulfur compounds.

Claims 8-10, 14-17, 23, 24 are rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Milton (2,882,244).

Michlmayr discloses a process of removal of thiophenes from gasoline by contacting the feed with an adsorbent which is silver exchanged faujasite zeolite, namely silver-Y zeolite (the abstract; examples).

Michlmayr does not disclose how to activate and regenerate the spent adsorbent. However, Milton discloses to activate a molecular sieve adsorbent used for removing thiophene by raising the temperature (col. 10, lines 40-45; col. 12, lines 40-50; col. 15, lines 23-40). Also note that Milton discloses nickel can be used as a cation of the adsorbent (col. 6, lines 66).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using Milton's method to activate the adsorbent by heating the adsorbent for an appropriate period of time to optimize the life of the adsorbent.

Claims 11-13, and 18 are rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Milton (2,882,244) further in view of Satokawa et al (US2001/0014304A1).

Michlmayr discloses a process as discussed above.

Michlmayr does not disclose that the copper is used as the cation (see entire patent). However, Satokawa discloses an adsorbent used for adsorb thiophene containing copper (abstract; paragraph 54).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by copper as the cation since Satokawa discloses that his adsorbent exhibits excellent absorptivity of sulfur compounds.

Claims 27, 28, 29, 31, 32, 33, 34, and 38-42 are rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Milton (2,882,244) further in view of Tsybulevskiy et al (US2002/0009404).

Michlmayr discloses a process of removal of thiophenes from gasoline by contacting the feed with an adsorbent which is silver exchanged faujasite zeolite, namely silver-Y zeolite (the abstract; examples).

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Michlmayr does not disclose how to activate and regenerate the spent adsorbent.

However, Milton discloses to activate a molecular sieve adsorbent used for removing thiophene by raising the temperature (col. 10, lines 40-45; col. 12, lines 40-50; col. 15, lines 23-40).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using Milton's method to activate the adsorbent by heating the adsorbent for an appropriate period of time to optimize the life of the adsorbent. Also note that Milton discloses nickel can be used as a cation of the adsorbent (col. 6, lines 66).

Michlmayr is silent as to the mechanism how thiophene is bound to the adsorbent, namely pi-complexation bonds (see entire patent for details). However, it is expected that the silver-Y zeolite adsorbent of Michlmayr is inherently bound to thiophene by pi-complexation since the adsorbent of the claimed process and the one of Michlmayr are similar.

Similarly, it is expected that the Michlmayr can inherently adsorb more than 1/mmol/gram of thiophene since the adsorbent of the claimed process and the one of Michlmayr are similar.

The temperature and pressure of the process can be found on column 1, lines 30-40.

Michlmayr also does not disclose that the gasoline is unleaded (see the entire patent for details). However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by using unleaded gasoline since it is expected any gasoline containing thiophene can be treated.

Michlmayr does not disclose that the silver exchanged Y zeolite is Ag(I)Y. However, it is obvious to one having ordinary skill in the art at the time the invention was made to have

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modified the Michlmayr process by using Ag(I)Y since it is expected that using any silver exchanged Y zeolite would yield similar results.

Michlmayr does not disclose a carrier for the adsorbent. However, Tsybulevskiy discloses an adsorbent also containing binder such as silica (paragraph 0041).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by including a binder to the adsorbent to arrive at the applicants' claimed process since it is expected that this would increase the strength of the adsorbent.

Once, a binder such as silica is obviously selected as the binder, metals are expected also to cover on the binder. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by selecting appropriate silica having appropriate surface area to optimize the properties of adsorbent.

Claims 30, 35 are rejected under 35 U.S.C. 103(a) as obvious over Michlmayr (4,188,285) in view of Milton (2,882,244) further in view of Tsybulevskiy et al (US2002/0009404) further in view of Satokawa et al (US2001/0014304A1).

Michlmayr discloses a process as discussed above.

Michlmayr does not disclose that the copper is used as the cation (see entire patent). However, Satokawa discloses an adsorbent used for adsorb thiophene containing copper (abstract; paragraph 54).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by copper as the cation since Satokawa discloses that his adsorbent exhibits excellent absorptivity of sulfur compounds..

Response to Amendment

The Declaration under 37 CFR 1.132 filed 7/6/05 is insufficient to overcome the rejection of claims based upon Michlmayr as set forth in the last Office action because:

In the declaration, Applicants declare that the Michlmayr's sorbent is not dehydrated as the one used in the applicants' claimed process is not persuasive since applicants cannot indicate where in the patent to Michlmayr discloses a non-dehydrated (wet) sorbent is used for removing thiophene. Therefore, the fact that the Michlmayr sorbent is a "wet" one is only a conclusion without a proof coming from the applicants. Further, one having ordinary skill in the art would recognize that the Michlmayr's sorbent must be a dry one since it is non-sense to use a wet sorbent for the process.

In the declaration, applicants show the results of comparing the claimed process and the Michlmayr process. However, the results cannot support unexpected results as declared by applicants since (1) the exemplified process is not the claimed process (see claims), it has been established that evidence of unobviousness must be commensurate in scope with the claims. *In re Kulling* 14 USPQ 2d 1056, 1058 (Fed. Cir. 1990); *In re Clemans* 206 USPQ 389 (CCPA 1980); *In re Dill* 202 USPQ 805, 808 (CCPA 1979); *In re Greenfield* 197 USPQ 227 (CCPA 1978); *In re Lindner* 173 USPQ 356, 358 (CCPA 1972); *In re Hyson* 172 USPQ 399 (CCPA

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1972); *In re Tiffin* 171 USPQ 294 (CCPA 1971); *In re McLaughlin* 170 USPQ 209 (CCPA 1971); *In re Kennedy* 168 USPQ 587 (CCPA 1971); *In re Law* 133 USPQ 653 (CCPA 1962).

(2) the exemplified process and the comparative process are operated by using different condition, different feeds. Therefore, it is not correct to say that the dehydration of sorbent is the factor increasing the adsorption of thiophene. It has been established by the patent law that the cause and effect sought to be proven is lost here in the welter of unfixed variables. *In re Heyna*, 360 F.2d 222, 228, 149 USPQ 692, 697 (CCPA 1966).

Response to Arguments

The argument that the Michlmayr does not teach dehydrating the sorbent is not persuasive since as discussed above, Michlmayr does not disclosed if the sorbent is dehydrated or not. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Michlmayr process by dehydrating the sorbent (if it is wet) since it is non-sense to use a wet sorbent for the process.

The argument that applicants disagrees with the examiner's assertion that the Michlmayr adsorbent inherently adsorbs more than 1 mmol/gram of thiophene as shown in examples 1 and 2 of Michlmayr is not persuasive since in example 1 and 2 of Michlmayr, a different condition is disclosed (1 atm versus 10^{-5} atm). Therefore, the difference of the capacity of the prior art sorbent and the one of the claimed process cannot be recognized.

The argument that Tsybulevskiy teaches away from pi-complexation as in paragraph [0036] is not persuasive since applicants do not claim how the carrier is bonded with the sulfur

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compound. Instead, applicants claim the metal not the carrier having this kind of bonding (see the claims).

The argument that Satokawa teaches an adsorbent for removing sulfur from a gas not liquid as called for in the claim is not persuasive since the Satokawa sorbent can adsorb the sulfur compound. Therefore, it is expected that in any environment – liquid or gas – this adsorbent containing silver nitrate can remove thiophene.

The argument that the sulfur compounds removed by the Satokawa sorbent is a saturated and non-aromatic compounds, while thiophene is an aromatic is not persuasive since Satokawa discloses generally sulfur compounds which must include thiophene.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thuan D. Dang whose telephone number is 571-272-1445. The examiner can normally be reached on Mon-Thu.

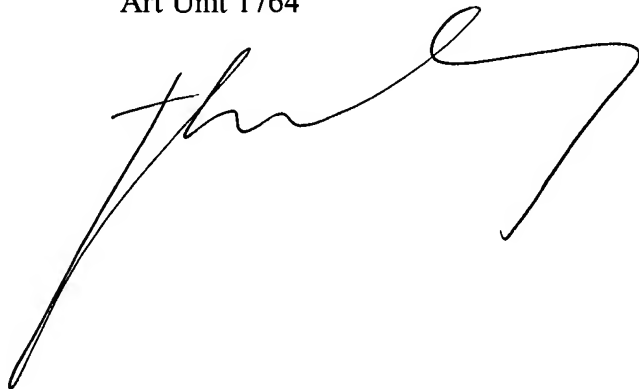
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thuan D. Dang
Primary Examiner
Art Unit 1764

10726935.20050919

A handwritten signature in black ink, appearing to read 'thuan', with a long, sweeping horizontal stroke extending to the right and a vertical line at the end.